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On motion of the Librarian, he was authorized to distribute the remaining copies of the Eulogium delivered on Rittenhouse by Dr. Rush.

Stated Meeting, Dec. 6.

Present, thirty-three members.

DR. CHAPMAN, Vice-President, in the Chair.

Letters were announced and read:—

From Professor Bujalsky, of St. Petersburg, accompanying the donation of a work on astronomy:—and

From Professor A. D. Bache, superintendent of the survey of the coast of the United States, dated Washington, Nov. 1, 1844, accompanying the sheets of a Map of New York Bay and Harbour, presented by him to the Society.

The following donations were announced:—

FOR THE LIBRARY.

The Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. VIII. Part 1. Whole number, XV. 8vo.—*From the Society.*

Journal Asiatique. Quatrième Série. Tome IV. Nos. 16, 17. Juillet, Août, 1844. 8vo.—*From the Asiatic Society of Paris.*

Map of New York Bay and Harbour, and the Environs. Founded upon a Trigonometrical Survey, under the direction of F. R. Hassler, Superintendent of the Survey of the Coast of the United States. Triangulation by James Ferguson and Edmund Blunt, Assistants. The Hydrography under the direction of Thomas R. Gedney, Lieut. U. S. Navy. The Topography by C. Renard and J. A. Jenkins, Assistants. Published in 1844, and presented under authority of an Act of Congress of the United States of June 3d, 1844, and by direction of the Treasury Department. A. D. Bache, Superintendent of the Coast Survey. In four Sheets.—*From the Treasury Department, through Prof. A. D. Bache.*

Proceedings of the Academy of Natural Sciences of Philadelphia.

- Vol. II. September, October, 1844. No. 5. 8vo.—*From the Academy.*
- Quarterly Summary of the Transactions of the College of Physicians of Philadelphia. November, December, 1842, and January, 1843. No. 5. 8vo.—*From the College.*
- Journal of the Franklin Institute of the State of Pennsylvania. Third Series. Vol. VIII. October, November, 1844. Nos. 4 and 5. 8vo.—*From Dr. Patterson.*
- The African Repository and Colonial Journal. Vol. XX. No. 11. November, 1844. 8vo.—*From the American Colonization Society.*
- The Medical News and Library. Vol. II. December, 1844. No. 24. 8vo.—*From Lea & Blanchard.*
- The Zoologist: a popular Monthly Magazine of Natural History. Nos. XXI. and XXII. September, October, 1844. 8vo.—*From Edward Newman, Esq., Editor.*
- The Electrical Magazine. Conducted by Charles V. Walker, Esq. Vol. I. No. 6. October, 1844. 8vo.—*From the Editor.*
- L'Anatomie Générale et Abrégée du Corps Humain. Nouvelle Édition. Par M. Bujalsky. In the Russian Language. St. Petersburg, 1844. 8vo.—*From the Author.*
- Descriptio Anatomico-pathologica gemellarum sibi invicem coaltarum, in quibus duo corda pariter inter se concreta, constituebant atrium et ventriculum unicum, cum debito tamen duobus cordibus vasorum majorum numero. By M. Bujalsky. St. Petersburg, 1832. Pamphlet.—*From the Author.*
- Two other Pamphlets on subjects of Anatomy and Surgery. In Russian.—*From the same.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

- Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XIX. Nos. 10, 11, 12, 13. September, 1844. 4to.
- Astronomische Nachrichten. No. 514. September 5, 1844. 4to.

The Committee, consisting of Mr. Walker, Dr. Patterson, and Professor Kendall, on Professor Loomis' paper, read November 15, 1844, and entitled, "Astronomical Observations made at Hudson Observatory, lat. $41^{\circ} 14' 42.6''$ north, and long. $5h 25m 39.5s$ west, third series," reported in favour of publication, which was ordered accordingly.

Prof. Loomis gives the latitude of the Hudson Observatory from 63 culminations of Polaris, with the meridian circle,

$$41^{\circ} 14' 42''6$$

The paper extends the series of moon culminations to the number of 259, and contains two occultations.

The longitude of Hudson Observatory, from Greenwich, by 150 corresponding moon culminations, is as follows:—

From 72 Greenwich observations,	<i>5h 25m 40.6s</i>
33 Cambridge, E. ,,	39.2
18 Oxford ,,	37.8
27 Edinburgh ,,	39.4

Allowing double weight to the Greenwich observations, the mean result is,

$$5h 25m 39.5s$$

The observations of Encke's comet in 1842, of the great comet of 1843, of the first Mauvais comet, and of the Faye comet, are given in full, with the apparent place of the stars used for comparison. The Faye comet was followed by Prof. Loomis, till the 11th of February, 1844.

This paper concludes the series of Prof. Loomis' labours at Hudson, he having accepted the appointment of Professor in the New York University. The Hudson Observatory is now in the hands of Prof. James Nooney.

Mr. Lea read a paper, entitled "Supplementary Note on the Construction of different Forms of the Magic Cyclovolute, by E. Nulty," which was referred to a Committee, consisting of Dr. Patterson, Mr. E. Morris, and Professor Kendall.

Dr. Patterson called the attention of the Society to a paper read before the Philosophical Society on the 14th of January, 1768, by Provost Ewing, prior to the union of the two societies from which this Society was formed. This paper, which has never been published, contains a general theory of magic squares, with its application. It was referred for examination to the same Committee.

Dr. Dunglison, at the request of Dr. Meigs, who was absent, read a paper, entitled "Case of Spina Bifida, by Henry Bond, M.D.," which was referred to a Committee consisting of Dr. Meigs, Dr. Dunglison, and Dr. Hays. Dr. Dunglison prefaced the reading of the paper by some remarks on the nature and

mode of production of these and similar arrests of development.

Professor Frazer read a letter from Mr. J. B. Maxwell, one of the trustees of Princeton College, to Professor Henry, dated Belvidere, Oct. 17, 1844, relating to the discovery of Mastodon bones on the farm of Mr. Abraham Ayers, near Hackettstown, New Jersey.

There are portions of the skeletons of five Mastodons—one pretty large—three of smaller size, and a calf: of the largest, only the grinders—portions of the tusks ($13\frac{1}{2}$ inches in circumference,) and some fragments of the larger bones remain—the rest having fallen to pieces on being exposed to the air. The bones of the calf fell to pieces in like manner, and no parts have been preserved except the grinders and the tusks, which were five or six inches long, about three-quarters of an inch in diameter, and seem to have projected more than an inch from the bone. Of the other three, the skulls and most of the larger bones are in good preservation. We measured some parts of the largest of them, as follows:—

Skull—from top of head at junction of the muscles of the neck to end of bone between the tusks—3 feet 4 inches.

„ Between the large cavities for the ears across the forehead—2 feet.

„ Orbit of the eye—vertical diameter, 6 inches.

„ Reniform orifice below the eyes, (communication between trunk and brain, &c.) 10 inches across by 4 inches vertically.

„ Oval orifice below this, (communication between trunk and throat,) $5\frac{1}{2}$ inches vertically by 3 across.

„ Tusk, from insertion, 2 feet 3 inches—whole length 3 feet 1 inch, and about 3 inches in diameter.

Pelvis, 4 feet 10 inches across, by 3 feet 8 inches.

Femoral bone, 3 feet long, 1 foot $1\frac{1}{2}$ inch in circumference in the middle.

Scapula, 2 feet 5 inches long, 2 feet 1 inch wide—measuring over the projection.

There were three grinders on each side above, and the same number below. The two others and the calf had four teeth on each side, both above and below, but the forward ones were evidently “milk teeth,” which would have been shed at a more advanced age. In

none of these four did the back grinders appear to have cut through the gum. The largest of the five had had three grinders on each side in each jaw. All the grinders were of the same character, having the projecting conical points which distinguish the Mastodon. In one of the skulls, the tusks projected outwards and inclined upwards, while in the other two they were inclined downwards and nearly parallel. This difference, and that in the number of the teeth had induced Mr. Ayers to believe that the remains belonged to more than one species. But Mr. Maxwell considered it to be evident that the only differences are those of age and sex. The bones which he measured, he supposed to be those of a female. The other two were younger animals, as was evident both from the teeth and the sutures of the skull, and as the skull with projecting tusks seemed to have a broader and rounder outline than the others, it probably belonged to a young male.

Mr. Ayers walked with Mr. Maxwell to the spot where they were dug out, and described the position in which they were discovered. North-west of the Musconetcong Valley, in which Hackettstown is situate, lies a range of highlands about two miles wide, rising perhaps 350 feet above the valley, and separating it from the valley of the Pequest. This ridge, which is of gneiss, and has, like all our mountains, a general course of about north-east, is cut into sections by transverse depressions, or hollows running generally about south of east. Through one of these depressions, which is probably 150 feet below the general level of the range, passes the road from Hackettstown to Vienna. By looking at Gordon's Map of New Jersey, a small stream is found to cross the road nearly half way to Vienna. Mr. Ayers' house is about 100 yards beyond the stream, and the bones were found more than a quarter of a mile beyond his house in a northerly direction, and perhaps 300 yards from the road. The Map does not represent the face of the country correctly. The road runs along the northern side of the valley or depression, most of which is occupied by a swampy meadow, through which the stream flows. From the road the ground rises regularly, but pretty rapidly, probably 120 feet in 200 yards, and then descends more gradually 25 or 30 feet into a smaller depression, which, however, does not cut through the ridge like the larger one, but descends very gradually from the general level on the east, and at its western end opens on the brow of the ridge by a kind of ravine. Near this western end is a depression or basin deeper than the outlet, and forming in wet weather a pond-hole. Mr. Ayers says, that formerly the water in it

was at times four or five feet deep, but some years ago he drained it in part by a ditch four feet deep, so that now it is merely a wet swampy place, about forty yards in length by twenty-five wide. During the drought last summer it became quite dry, and he took the opportunity to dig out a portion of the earth for manure. In doing this he discovered the bones. The basin slopes gradually from the east to a depth of about twelve feet near the western side. On the top is about one foot of vegetable deposit formed of decayed leaves, &c., then about six inches of whitish sand mixed with vegetable matter, and below this a deposit, which Mr. Ayers says, when first opened, was of a yellowish colour, very much resembling in appearance the manure of a cow yard when thrown up in heaps in the winter, and had a very strong smell of the same kind. Exposure to the weather has changed its colour to the dull, bluish black of swamp earth, which it seems to be mixed with, great quantities of vegetable remains, principally of marsh plants, with scattered fragments of branches of trees, &c. In this deposit the remains were found covered from four to six feet deep, except the largest, which lay near the south-east side of the basin, and were but slightly covered. A few feet to the north of this lay the next in size on its back, and a little to the north and west of this the other two, both as if in a standing position, and the calf was found in a similar position near the north side of the basin. From Mr. Ayers' description, the bones of the largest one must have been disturbed after its death, as the tusks were found reversed alongside of the neck. Between the ribs of two or three of them, was a considerable quantity of what Mr. Ayers describes as resembling coarse chopped straw, mixed with fragments of sticks,—no doubt the contents of the stomach.

Not more than one-fourth of the basin has been examined. The openings in it have been made at random, and in each an animal has been found, so that there is probably a number more. "The question," says Mr. Maxwell, "very naturally occurs, how and when did so many of these huge animals become imbedded in this narrow space? Questions more easily asked than answered. My first conjecture before seeing the place, was that they had been mired in attempting to reach a spring or lick; but the small extent and shallowness of the basin, and the gradual descent and character of its bottom, (which as far as has been examined, is perfectly solid and like much of the ground around, closely paved with rolled stones of gneiss and limestone, generally 6 or 8 inches in diameter,) all forbid such a supposition. It is possible that they may have been swept there by a deluge,

which, from the configuration of the surrounding country, would, as it subsided, sweep through the larger depression, with a current to the east, and form an eddy through this one to the west. The whole depression has, in form, a close resemblance to such as we see formed on a smaller scale in the sand along the Delaware. But on the other hand, the number found together, most of them in a standing position, would seem rather to indicate that they had been overwhelmed in one of their native haunts, by some sudden catastrophe; and some circumstances seem to favour the supposition that this could not have been at a very remote period. This little basin receives the drainage of some fifteen acres of land, and seems to have had a considerable growth of grass and marsh plants around it. Under such circumstances, it would seem that the accumulation of vegetable matter indicates no very great antiquity. The holes were so filled with water that I could not ascertain whether the deposit below the sand showed any thing like stratification, but as far as I could judge from what was thrown out, its character was pretty uniform throughout, exhibiting the appearance of a marsh, much frequented by animals, which had trampled fragments of its plants all through it. I regretted very much that my knowledge was not sufficient to determine the species of the plants of which so many portions remain, but I thought I recognised some which are now growing in the neighbouring marshes, such as flags, cattails, &c. I hope, however, that you or some of your scientific friends, will visit the place, and obtain more accurate information than I am competent to give."

Mr. S. Roberts drew the attention of the Society to a steam-boat now lying in the Delaware, intended to navigate canals, and gave a description of it and its machinery.

The steam canal boat "John Gilpin" belongs to New York, and has made three trips, within a short time, to St. John's, in Canada, having passed through the Champlain canal. Her length is eighty feet, and her extreme breadth thirteen feet four inches. When drawing three feet water, she carries forty-five tons; and with four and a half feet water, sixty-five tons.

Her steam engine is in the bow, and is of twenty horse power, having a locomotive or tubular boiler, and burning anthracite coal. The diameter of the cylinder is sixteen inches, and the length of the stroke twenty-eight inches.

The boat is propelled by two paddle wheels of wrought iron, one

on each side of the bow, and enclosed within the line of the sides of the boat. Each wheel is seven and a half feet in diameter, and two feet wide, and the paddles are of sheet iron, and inclined at an angle of about forty degrees, so as to throw the water out from the sides of the boat; the wheels revolving in planes parallel to the keel. This arrangement is peculiar, and is stated to work exceedingly well in navigating canals. It is contrived by Mr. Asa Worthington, of New York. The boat can propel herself ten miles an hour in open water; and she towed three barges from New York, bringing them through the Delaware and Raritan Canal at the rate of nearly four miles an hour. The boat is new, and her whole cost has been \$5500, the hull being of wood.

The foregoing information was obtained on board the boat, from her owner, Captain J. W. Low.

The distance from St. John's, in Canada, to Philadelphia, is nearly five hundred miles; and the Champlain Canal being now frozen, the boat is going southward to the Dismal Swamp Canal, to ply there during the winter. She is said not to injure the banks more than an ordinary packet boat.

The interest felt on the subject of steam traction on canals, both in this country and in England, makes the boat well worthy of examination, especially in reference to her small size in combination with her great power for towing heavy tonnage. She could readily pass through the Pennsylvania Canal.

The observations of Mr. Roberts gave occasion to remarks from Messrs. Cresson, Baldwin, Frazer, E. Morris, and A. D. Bache, on the peculiar construction of the water-wheels of this boat, the paddles being inclined to the direction of the motion of the vessel, whilst the plane of revolution of the wheel was in that direction,—and on the theory of the position of the paddle wheel, the proper position of the wheels or propellers of a canal boat, and other points.

The Treasurer, Mr. Ord, presented his accounts for the year as required by the laws of the Society, which were referred to the Committee of Finance.

Mr. Lea, from the Committee of Publication, in conformity with the laws, laid their accounts for the year before the Society. The balance of funds in the hands of the Committee is three hundred and eighty-five dollars and sixty-four cents.

The Librarian, Mr. Ord, reported that he had surrendered to Mr. F. Blake, applying on behalf of the family of Captain Rogers, the log-book of the steam-ship Savannah, which had been deposited with the Society by the late Vice President Hopkinson, on the 3d of April, 1840.

On motion of Mr. Walker, a Committee was appointed to make and collect observations on the solar eclipse of Dec. 9. The Committee appointed were Mr. Walker, Dr. Patterson, Prof. A. D. Bache, Prof. Kendall, Mr. R. T. Paine, Prof. Alexander, Prof. Frazer, Prof. Bartlett, Mr. Lukens, Prof. Loomis, Prof. Norton, Prof. Locke, Mr. Gummere, Mr. Chas. J. Wistar, Prof. Courtenay, Prof. Cresson, Prof. Peirce, Mr. Borden, Mr. Downes, and Mr. Charles M'Euen.

Stated Meeting, Dec. 20.

Present, thirty-nine members.

Dr. PATTERSON, Vice-President, in the Chair.

Letters were announced and read:—

From the Academy of Natural Sciences of Philadelphia, dated Philadelphia, Dec. 9, 1844, acknowledging the receipt of a copy of Dr. Dunglison's discourse on the late President of the Society:—and,

From Mr. Dudley Leavitt, dated Meredith, November, 1844, accompanying tables of the moon's rising and setting.

Professor Perry, of the United States' Navy, member of the Maryland Academy of Sciences, was introduced by Mr. Walker, and took his seat.

The following donations were announced:—

FOR THE LIBRARY.

The Twenty-eighth Report of the Directors of the American Asylum, at Hartford, for the Education and Instruction of the Deaf and Dumb. Exhibited to the Asylum, May 11, 1844. Hartford, 1844. 8vo.—*From the Directors.*

An Introductory Lecture to the Course of Institutes of Medicine, &c.,